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MCRD PARRIS ISLAND
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U S NAVY RESPONSE TO SOUTH CAROLINA DEPARTMENT OF HEALTH AND
ENVIRONMENTAL CONTROL COMMENTS DATED 22 JUNE 2012 TO WORK PLAN FOR
EXPANDED SITE INSPECTION UXO 2 AND 4 SUBAREA MCRD PARRIS ISLAND SC
5/1/2012
U S NAVY

**RESPONSE TO SCDNR COMMENTS DATED JUNE 22, 2012
WORK PLAN FOR MUNITIONS RESPONSE PROGRAM EXPANDED SITE INSPECTION AT
UXO 2 AND ROCKET RANGE UXO 4 SUBAREA, DATED MAY 2012
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA**

Priscilla H. Wendt, Office of Environmental Programs

6.5 Sample Design and Rationale

6.5.1 UXO 2

1. **Comment:** Please explain the rationale for sampling upland soils at twelve locations, while sampling intertidal marsh sediments at only six locations.

Response: Initially, six soil sample locations and six sediment sample locations were proposed for collection at Unexploded Ordnance (UXO) 2. Per United States Environmental Protection Agency (USEPA) comments (USEPA comments dated April 6, 2012), six additional soil sample locations were added in order to collect a sufficient number of soil samples to calculate a 95% Upper Confidence Limit (UCL). Therefore, in the area of the concrete target foundations at UXO 2, twelve surface soil samples (0 to 1 foot below ground surface [bgs]) were collected at twelve soil sample locations and twelve sediment samples (0 to 6 inches bgs and 6 to 24 inches bgs) were collected at six sediment sample locations to supplement the Site Inspection (SI) sampling effort. For each of soil and sediment media, the SI and Expanded SI data will be combined as one data set for evaluation purposes.

The attached sampling summary and data tables and supporting figures, including a tag map, was extracted from the February 12, 2013 presentation at the Tier I meeting. Note that the presentation included the statement: "Later, warehouses and storage structures were built and remain at the site." In fact, there are no structures on the site today except a little picnic pavilion - but the picnic pavilion is actually outside the western boundary south of the 200 yard line); also, the aerial photo in the presentation shows some items at approximately the 500 yard line - those items are RVs, boats, etc. where the Marines must store such items (they cannot be stored in driveways or yards). Therefore, the presentation attachment has been revised to state "There are no structures currently on the site except for a small picnic pavilion actually outside the western boundary south of the 200 yard line."

2. **Comment:** Please explain the rationale for the selection of the six sediment sampling locations shown in Figure 6-1. They appear to be clustered mostly toward the southeast corner of the rifle range boundary, with no sediment sample locations near the southwest corner of the range. Is there sufficient information on the location of MC from the initial Site Inspection to eliminate the marsh area downrange of the southwest boundary as an area of potential concern?

Response: Expanded SI sediment sample locations were chosen based on the results of the 2010 SI associated with the concrete target foundations. Exceedances of sediment screening criteria were noted in sediment samples collected in the south eastern corner of UXO 2, there were no screening criteria exceedances in sediment samples collected in the

south western portion of UXO 2. Therefore, Expanded SI sediment sample locations were biased toward the south eastern corner of UXO 2.

6.5.2 Rocket Range UXO 4 Subarea

3. **Comment:** Composite or “Incremental” Samples (IS) are proposed to be collected at up to twelve locations (four upland sites, six marsh sites, and two “discretionary” sites). In addition, six individual sediment samples from each of two depth intervals will be collected “below rocket finds”; however, no individual soil samples are proposed to be collected. Please explain the rationale for collecting six individual sediment samples, but no individual soil samples in the UXO 4 Subarea. Is there sufficient information from the initial site reconnaissance to obviate the need to collect individual soil samples?

Response: Site reconnaissance was conducted at the Rocket Range UXO 4 Subarea impact/target in January and February 2012, and practice rockets were observed in the marshy area, with the density decreasing with increased distance from the impact/target area. Discrete sediment samples were proposed at the Rocket Range UXO 4 Subarea for collection at biased locations of munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) finds, which were expected to be predominantly in the marshy area, where practice rocket debris was observed during site reconnaissance. No discrete sampling was proposed for the upland soil because there was not expected to be a high concentration of MEC/MPPEH found in this area. Data collected to date will be evaluated to determine if data quality objectives have been achieved. Then a Team conference call or meeting will be conducted to discuss the path forward.

UXO 2 – RIFLE RANGE AT BALLAST CREEK

UXO 2 – RIFLE RANGE AT BALLAST CREEK

Table/Figure Number	CSM and Investigation Summary	Path Forward
Figures X2-1 X2-2	<p>History: This site was used as a Rifle Range from 1916 to 1919. Following World War I, the range was used as an aircraft flying field. There are no structures currently on the site except for a small picnic pavilion actually outside the western boundary south of the 200 yard line. According to the ASR (USACE, 1999a), ..."the Rifle Range at Ballast Creek has been heavily regraded and reportedly received dredge spoil in the past," and "Most of the land for this site has since been covered by dredge fill." The area that was covered with dredge fill is the area currently being investigated under the IRP as Site 13C.</p> <p>Munitions use at this range was limited to small arms ammunition, there is no historical documentation that would suggest the past use or current presence of MEC at this site.</p>	Prepare ESI Report including risk assessment.
Figure X2-3	<p>MEC/MPPEH: Detector-aided surveys were conducted over accessible portions of firing lines to locate potential buried caches of bullets. Several preliminary intrusive investigations were conducted on the 600 yard line, with only cultural debris and stray range-related items (e.g., cartridge piece) found with no caches of bullets found. In accordance with field change request #2, investigation of 3 transects at each firing line for caches of bullets proceeded, with no caches of bullets found.</p> <p>The 75mm point detonating fuze (MDAS) found in the shallow subsurface is not site related.</p>	
Tables X2-1 X2-2 X2-3 Figures X2-4 X2-5	<p>MC: Incremental soil samples were collected at accessible portions of firing lines during the ESI. Discrete surface soil and sediment samples were collected during both the SI and ESI in the area near the targets. Site data, supplemented with Site 4 historical data, appears to be adequate and no further investigation is anticipated.</p>	

TABLE X2-1

**SI/ESI SAMPLE COLLECTION SUMMARY FOR LABORATORY ANALYSIS
UXO 2 – RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA**

Investigation	Location	Sample Number	Sample Type	Date Collected	Medium	Depth Collected (inches)	Analyses
SI	X02SB01	X02SS01G0001	Discrete/ Original	2-6-10	Soil	0-12	Lead pH (X02SS05G0001 only)
SI	X02SB02	X02SS02G0001	Discrete/ Original	2-6-10		0-12	
SI	X02SB03	X02SS03G0001	Discrete/ Original	2-6-10		0-12	
SI	X02SB04	X02SS04G0001	Discrete/ Original	2-6-10		0-12	
SI	X02SB05	X02SS05G0001	Discrete/ Original	2-6-10		0-12	
ESI	X02IS101	X02IS101-0002-01	Incremental/ Original	6-15-12		0-2	NG
		X02IS101-0002-02	Incremental/ Duplicate	6-15-12		0-2	
		X02IS101-0002-03	Incremental/ Triplicate	6-15-12		0-2	
ESI	X02IS102	X02IS102-0002	Incremental/ Original	6-15-12		0-2	
ESI	X02IS103	X02IS103-0002	Incremental/ Original	6-14-12		0-2	
ESI	X02IS104	X02IS104-0002	Incremental/ Original	6-14-12		0-2	
ESI	X02IS105	X02IS105-0002	Incremental/ Original	6-13-12		0-2	
ESI	X02SB101	X02SS101-0012-0712	Discrete/ Original	7-12-12		0-12	Select Metals (antimony, arsenic, copper, lead and zinc) pH (X02SS102-0012-0712 and X02SS103-0012-0712 only)
		X02SS101-0012-0712-D	Discrete/ Duplicate	7-12-12		0-12	
ESI	X02SB102	X02SS102-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB103	X02SS103-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB104	X02SS104-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB105	X02SS105-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB106	X02SS106-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB107	X02SS107-0012-0712	Discrete/ Original	7-12-12		0-12	
		X02SS107-0012-0712-D	Discrete/ Duplicate	7-12-12		0-12	

TABLE X2-1

**SI/ESI SAMPLE COLLECTION SUMMARY FOR LABORATORY ANALYSIS
UXO 2 – RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA**

Investigation	Location	Sample Number	Sample Type	Date Collected	Medium	Depth Collected (inches)	Analyses
ESI	X02SB108	X02SS108-0012-0712	Discrete/ Original	7-12-12	Soil	0-12	Select Metals (antimony, arsenic, copper, lead and zinc) pH (X02SS102-0012-0712 and X02SS103-0012-0712 only)
ESI	X02SB109	X02SS109-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB110	X02SS110-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB111	X02SS111-0012-0712	Discrete/ Original	7-12-12		0-12	
ESI	X02SB112	X02SS112-0012-0712	Discrete/ Original	7-12-12		0-12	
SI	X02SD01	X02SD01G0006	Discrete/ Original	2-6-10	Sediment	0-6	Lead TOC (X02SD10G0006 only)
		X02SD01G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD02	X02SD02G0006	Discrete/ Original	2-6-10		0-6	
		X02SD02G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD03	X02SD03G0006	Discrete/ Original	2-6-10		0-6	
		X02SD03G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD04	X02SD04G0006	Discrete/ Original	2-6-10		0-6	
		X02SD04G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD05	X02SD05G0006	Discrete/ Original	2-6-10		0-6	
		X02SD05G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD06	X02SD06G0006	Discrete/ Original	2-6-10		0-6	
		X02SD06G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD07	X02SD07G0006	Discrete/ Original	2-6-10		0-6	
		X02SD07G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD08	X02SD08G0006	Discrete/ Original	2-6-10		0-6	
		X02SD08G2436	Discrete/ Original	2-6-10		24-36	
SI	X02SD09	X02SD09G0006	Discrete/ Original	2-6-10		0-6	
		X02SD09G2436	Discrete/ Original	2-6-10		24-36	

TABLE X2-1

**SI/ESI SAMPLE COLLECTION SUMMARY FOR LABORATORY ANALYSIS
UXO 2 – RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA**

Investigation	Location	Sample Number	Sample Type	Date Collected	Medium	Depth Collected (inches)	Analyses
SI	X02SD10	X02SD10G0006	Discrete/ Original	2-6-10	Sediment	0-6	Lead TOC (X02SD10G0006 only)
		X02SD10G0006-D	Discrete/ Duplicate	2-6-10		0-6	
		X02SD10G2436	Discrete/ Original	2-6-10		24-36	
ESI	X02SD101	X02SD101-0006-0712	Discrete/ Original	7-11-12		0-6	Select Metals (antimony, arsenic, copper, lead and zinc) TOC (X02SD102-0006-0712, X02SD102-0624-0712, X02SD103-0006-0712, and X02SD103-0624-0712 only) pH (X02SD102-0006-0712, X02SD102-0624-0712, X02SD103-0006-0712, and X02SD103-0624-0712 only)
		X02SD101-0006-0712-D	Discrete/ Duplicate	7-11-12		0-6	
		X02SD101-0624-0712	Discrete/ Original	7-11-12		6-24	
		X02SD101-0624-0712-D	Discrete/ Duplicate	7-11-12		6-24	
ESI	X02SD102	X02SD102-0006-0712	Discrete/ Original	7-11-12		0-6	
		X02SD102-0624-0712	Discrete/ Original	7-11-12		6-24	
ESI	X02SD103	X02SD103-0006-0712	Discrete/ Original	7-11-12		0-6	
		X02SD103-0624-0712	Discrete/ Original	7-11-12		6-24	
ESI	X02SD104	X02SD104-0006-0712	Discrete/ Original	7-11-12		0-6	
		X02SD104-0624-0712	Discrete/ Original	7-11-12		6-24	
ESI	X02SD105	X02SD105-0006-0712	Discrete/ Original	7-11-12		0-6	
		X02SD105-0624-0712	Discrete/ Original	7-11-12		6-24	

TOC - Total organic carbon

TABLE X2-2

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 1 OF 4

LOCATION SAMPLE ID	Background ⁽¹⁾	X02SB01 X02SS01G0001			X02SB02 X02SS02G0001			X02SB03 X02SS03G0001			X02SB04 X02SS04G0001			X02SB05 X02SS05G0001			X02SB101 X2SS101-0012-0712 X2SS101-0012-0712-AVG					
SAMPLE DATE		20100206			20100206			20100206			20100206			20100206			20120712			20120712		
SAMPLE CODE		NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			ORIGINAL			AVERAGE		
MATRIX		SO			SO			SO			SO			SO			SO			SO		
TOP DEPTH (inches)		0			0			0			0			0			0			0		
BOTTOM DEPTH (inches)		12			12			12			12			12			12			12		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	1.16	NA			NA			NA			NA			NA			1.22	J	0.202	1.315		NA
COPPER	2.50	NA			NA			NA			NA			NA			1.74	U	0.298	1.44		NA
LEAD	6.92	9.8	0.18	15.4	0.15	13	0.14	7.2	0.13	15.5	0.14	4.64		0.328	5.335		NA					
ZINC	4.27	NA			NA			NA			NA			NA			8.39		0.398	7.535		NA
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	71			71			76			82			70			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			7.7	0.1		NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Discrete soil samples collected during SI were analyzed for lead only.
Select SI soil samples were also analyzed for pH.

Discrete soil samples collected during ESI were analyzed for select metals
(antimony, arsenic, copper, lead, and zinc).
Select ESI soil samples were also analyzed for pH.

Incremental samples collected during the ESI were analyzed for NG only, all
were non-detect.

(1) MCAS Beaufort background representative concentration (Tetra Tech, 2006).

TABLE X2-2

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 2 OF 4

LOCATION SAMPLE ID	Background ⁽¹⁾	X02SB101 X2SS101-0012-0712 D			X02SB102 X2SS102-0012-0712			X02SB103 X2SS103-0012-0712			X02SB104 X2SS104-0012-0712			X02SB105 X2SS105-0012-0712			X02SB106 X2SS106-0012-0712			X02SB107 X2SS107-0012-0712		
SAMPLE DATE		20120712			20120712			20120712			20120712			20120712			20120712			20120712		
SAMPLE CODE		DUPLICATE			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			ORIGINAL		
MATRIX		SO			SO			SO			SO			SO			SO			SO		
TOP DEPTH (inches)		0			0			0			0			0			0			0		
BOTTOM DEPTH (inches)		12			12			12			12			12			12			12		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	1.16	1.41		0.2	1.61	J	0.199	0.912	J	0.188	0.605	J	0.203	3.86		0.224	1.62		0.206	0.472	J	0.204
COPPER	2.50	2.01		0.287	1.7	U	0.295	1.39	U	0.309	1.99		0.304	6.81		0.339	1.71		0.318	2.09		0.295
LEAD	6.92	6.03		0.315	5.1		0.324	5.42		0.34	4.7		0.335	15.9		0.373	7.12		0.349	33.8		0.324
ZINC	4.27	6.68		0.382	5.84		0.393	4.89		0.412	4.91		0.406	28.6		0.453	6.06		0.423	4.13		0.393
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			6.6		0.01	5.84		0.01	NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Discrete soil samples collected during SI were analyzed for lead only.
Select SI soil samples were also analyzed for pH.

Discrete soil samples collected during ESI were analyzed for select metals
(antimony, arsenic, copper, lead, and zinc).
Select ESI soil samples were also analyzed for pH.

Incremental samples collected during the ESI were analyzed for NG only, all
were non-detect.

(1) MCAS Beaufort background representative concentration (Tetra Tech, 2006)

TABLE X2-2

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 3 OF 4

LOCATION	Background ⁽¹⁾	X02SB107						X02SB108			X02SB109			X02SB110			X02SB111			X02SB112		
SAMPLE ID		X2SS107-0012-0712			X2SS107-0012-0712			X2SS108-0012-0712			X2SS109-0012-0712			X2SS110-0012-0712			X2SS111-0012-0712			X2SS112-0012-0712		
SAMPLE DATE		AVG			D			20120712			20120712			20120712			20120712			20120712		
SAMPLE CODE		AVERAGE			DUPLICATE			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL		
MATRIX		SO			SO			SO			SO			SO			SO			SO		
TOP DEPTH (inches)		0			0			0			0			0			0			0		
BOTTOM DEPTH (inches)		12			12			12			12			12			12			12		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	1.16	0.4775		NA	0.483	J	0.199	0.696	J	0.206	0.225	J	0.21	2.91		0.213	0.967	J	0.21	0.913	J	0.203
COPPER	2.50	2.035		NA	1.98		0.305	1.59		0.305	0.327	J	0.308	3.29		0.318	3.04		0.313	1.23		0.293
LEAD	6.92	31.2		NA	28.6		0.335	6.08		0.335	3.97		0.339	9.64		0.349	14.4		0.345	4.53		0.322
ZINC	4.27	3.955		NA	3.78		0.406	4.94		0.406	1.39		0.411	12.8		0.423	8.44		0.418	3.99		0.39
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Discrete soil samples collected during SI were analyzed for lead only.
Select SI soil samples were also analyzed for pH.

Discrete soil samples collected during ESI were analyzed for select metals
(antimony, arsenic, copper, lead, and zinc).
Select ESI soil samples were also analyzed for pH.

Incremental samples collected during the ESI were analyzed for NG only, all
were non-detect.

(1) MCAS Beaufort background representative concentration (Tetra Tech, 2006)

TABLE X2-2

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 4 OF 4

LOCATION SAMPLE ID		X2IS101-0002-01	X02IS101 X2IS101-0002-02			X2IS101-0002-03	X02IS102 X2IS102-0002-01			X02IS103 X2IS103-0002	X02IS104 X2IS104-0002			X02IS105 X2IS105-0002		
SAMPLE DATE	Background ⁽¹⁾	20120615 ORIGINAL	20120615 DUPLICATE			20120615 TRIPLICATE	20120615 NORMAL			20120614 NORMAL	20120614 NORMAL			20120613 NORMAL		
SAMPLE CODE		SO	SO			SO	SO			SO	SO			SO		
MATRIX		0	0			0	0			0	0			0		
TOP DEPTH (inches)		2	2			2	2			2	2			2		
BOTTOM DEPTH (inches)																
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	1.16	NA			NA			NA			NA			NA		
COPPER	2.50	NA			NA			NA			NA			NA		
LEAD	6.92	NA			NA			NA			NA			NA		
ZINC	4.27	NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (%)																
TOTAL SOLIDS	NC	NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																
pH	NC	NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Discrete soil samples collected during SI were analyzed for lead only.
Select SI soil samples were also analyzed for pH.

Discrete soil samples collected during ESI were analyzed for select metals
(antimony, arsenic, copper, lead, and zinc).
Select ESI soil samples were also analyzed for pH.

Incremental samples collected during the ESI were analyzed for NG only, all
were non-detect.

(1) MCAS Beaufort background representative concentration (Tetra Tech, 2006)

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 1 OF 6

LOCATION		X02SD01						X02SD02						X02SD03						X02SD04		
SAMPLE ID		X02SD01G0006			X02SD01G2436			X02SD02G0006			X02SD02G2436			X02SD03G0006			X02SD03G2436			X02SD04G0006		
SAMPLE DATE	Background ⁽¹⁾	20100206			20100206			20100206			20100206			20100206			20100206			20100206		
SAMPLE CODE		NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL		
MATRIX		SD			SD			SD			SD			SD			SD			SD		
TOP DEPTH (inches)		0			24			0			24			0			24			0		
BOTTOM DEPTH (inches)		6			36			6			36			6			36			6		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	3.98	NA			NA			NA			NA			NA			NA			NA		
COPPER	12.07	NA			NA			NA			NA			NA			NA			NA		
LEAD	7.99	7.1		0.16	3.5		0.11	5.9		0.13	4.6		0.1	5.5		0.14	4.3		0.14	8.4		0.13
ZINC	38.42	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	73			78			77			77			76			77			74		
MISCELLANEOUS PARAMETERS (MG/KG)																						
TOTAL ORGANIC CARBON	NC	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Sediment samples collected during SI were analyzed for lead only.
Select SI sediment samples were also analyzed for TOC.

Sediment samples collected during ESI were analyzed for select (antimony, arsenic, copper, lead, and zinc).
Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tech, 2006).

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 2 OF 6

LOCATION		X02SD04			X02SD05						X02SD06						X02SD07					
SAMPLE ID		X02SD04G2436			X02SD05G0006			X02SD05G2436			X02SD06G0006			X02SD06G2436			X02SD07G0006			X02SD07G2436		
SAMPLE DATE	Background ⁽¹⁾	20100206			20100206			20100206			20100206			20100206			20100206			20100206		
SAMPLE CODE		NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL		
MATRIX		SD			SD			SD			SD			SD			SD			SD		
TOP DEPTH (inches)		24			0			24			0			24			0			24		
BOTTOM DEPTH (inches)		36			6			36			6			36			6			36		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	3.98	NA			NA			NA			NA			NA			NA			NA		
COPPER	12.07	NA			NA			NA			NA			NA			NA			NA		
LEAD	7.99	4.1		0.15	5		0.12	31.4		0.18	30.9		0.18	73.7		0.17	112		0.14	3.9		0.15
ZINC	38.42	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	70			73			68			68			65			68			79		
MISCELLANEOUS PARAMETERS (MG/KG)																						
TOTAL ORGANIC CARBON	NC	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Sediment samples collected during SI were analyzed for lead only.
Select SI sediment samples were also analyzed for TOC.

Sediment samples collected during ESI were analyzed for select (antimony, arsenic, copper, lead, and zinc).
Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tec

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 3 OF 6

LOCATION		X02SD08						X02SD09						X02SD10								
SAMPLE ID		X02SD08G0006			X02SD08G2436			X02SD09G0006			X02SD09G2436			X02SD10G0006			X02SD10G0006-AVG			X02SD10G0006-D		
SAMPLE DATE	Background ⁽¹⁾	20100206			20100206			20100206			20100206			20100206			20100206			20100206		
SAMPLE CODE		NORMAL			NORMAL			NORMAL			NORMAL			ORIGINAL			AVERAGE			DUPLICATE		
MATRIX		SD			SD			SD			SD			SD			SD			SD		
TOP DEPTH (inches)		0			24			0			24			0			0			0		
BOTTOM DEPTH (inches)		6			36			6			36			6			6			6		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	3.98	NA			NA			NA			NA			NA			NA			NA		
COPPER	12.07	NA			NA			NA			NA			NA			NA			NA		
LEAD	7.99	33.7	0.13		10.9	0.12		142	0.13		6.4		0.14	12.6	0.11		13.9	NA		15.2	0.15	
ZINC	38.42	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	73			77			71			81			75			75.5			76		
MISCELLANEOUS PARAMETERS (MG/KG)																						
TOTAL ORGANIC CARBON	NC	NA			NA			NA			NA			8800	110		8800	NA		NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

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Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tec

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 4 OF 6

LOCATION		X02SD10			X02SD101																	
SAMPLE ID		X02SD10G2436			X2SD101-0006-0712			X2SD101-0006-0712-AVG			X2SD101-0006-0712-D			X2SD101-0624-0712			X2SD101-0624-0712-AVG			X2SD101-0624-0712-D		
SAMPLE DATE	Background ⁽¹⁾	20100206			20120711			20120711			20120711			20120711			20120711			20120711		
SAMPLE CODE		NORMAL			ORIGINAL			AVERAGE			DUPLICATE			ORIGINAL			AVERAGE			DUPLICATE		
MATRIX		SD			SD			SD			SD			SD			SD			SD		
TOP DEPTH (inches)		24			0			0			0			6			6			6		
BOTTOM DEPTH (inches)		36			6			6			6			24			24			24		
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL
ARSENIC	3.98	NA			3.84	J	0.233	4.295		NA	4.75	J	0.234	0.952	J	0.253	1.401		NA	1.85	J	0.247
COPPER	12.07	NA			0.754	U	0.377	0.7215	U	NA	0.689	U	0.345	0.707	U	0.353	0.6985	U	NA	0.69	U	0.345
LEAD	7.99	7.3		0.13	2.89		0.415	2.81		NA	2.73		0.379	2.19		0.389	1.915		NA	1.64		0.379
ZINC	38.42	NA			3.25	U	0.503	2.69	U	NA	2.13	U	0.459	3.22	U	0.471	3.075	U	NA	2.93	U	0.46
MISCELLANEOUS PARAMETERS (%)																						
TOTAL SOLIDS	NC	81			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (MG/KG)																						
TOTAL ORGANIC CARBON	NC	NA			NA			NA			NA			NA			NA			NA		
MISCELLANEOUS PARAMETERS (S.U.)																						
pH	NC	NA			NA			NA			NA			NA			NA			NA		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Sediment samples collected during SI were analyzed for lead only.
Select SI sediment samples were also analyzed for TOC.

Sediment samples collected during ESI were analyzed for select (antimony, arsenic, copper, lead, and zinc).
Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tec

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 5 OF 6

LOCATION		X02SD102						X02SD103						X02SD104						X02SD105					
SAMPLE ID		X2SD102-0006-0712			X2SD102-0624-0712			X2SD103-0006-0712			X2SD103-0624-0712			X2SD104-0006-0712			X2SD104-0624-0712			X2SD105-0006-0712					
SAMPLE DATE	Background ⁽¹⁾	20120711			20120711			20120711			20120711			20120711			20120711			20120711					
SAMPLE CODE		NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL			NORMAL					
MATRIX		SD			SD			SD			SD			SD			SD			SD					
TOP DEPTH (inches)		0			6			0			6			0			6			0					
BOTTOM DEPTH (inches)		6			24			6			24			6			24			6					
METALS (MG/KG)		Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL	Result	Qual	MDL			
ARSENIC	3.98	0.926	J	0.215	1.54	J	0.248	1.56	J	0.232	0.687	J	0.244	1.52	J	0.262	2.35	J	0.254	1.4	J	0.226			
COPPER	12.07	1.01	U	0.312	1.55	U	0.33	0.978	U	0.362	0.717	U	0.358	30.3		0.349	31.3		0.391	0.893	U	0.332			
LEAD	7.99	2.46		0.344	2.67		0.364	3.73		0.398	1.51		0.394	110		0.384	54.3		0.43	2.12		0.365			
ZINC	38.42	4.19	U	0.416	6.36		0.441	3.44	U	0.483	3.39	U	0.478	33		0.466	21.8		0.521	3.55	U	0.442			
MISCELLANEOUS PARAMETERS (%)																									
TOTAL SOLIDS	NC	NA			NA			NA			NA			NA			NA			NA					
MISCELLANEOUS PARAMETERS (MG/KG)																									
TOTAL ORGANIC CARBON	NC	2260			33.3			3120			33.3			4080			33.3			1820			33.3		
MISCELLANEOUS PARAMETERS (S.U.)																									
pH	NC	8.03			0.01			8.05			0.01			7.23			0.01			7.47			0.01		

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

Shaded concentrations exceed background.

Sediment samples collected during SI were analyzed for lead only.
Select SI sediment samples were also analyzed for TOC.

Sediment samples collected during ESI were analyzed for select (antimony, arsenic, copper, lead, and zinc).
Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tec

TABLE X2-3

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA
PAGE 6 OF 6

LOCATION SAMPLE ID		X02SD105 X2SD105-0624-0712
SAMPLE DATE SAMPLE CODE MATRIX TOP DEPTH (inches) BOTTOM DEPTH (inches)	Background ⁽¹⁾	20120711 NORMAL SD 6 24
METALS (MG/KG)		ResultQualMDL
ARSENIC	3.98	1.69J0.245
COPPER	12.07	0.929U0.349
LEAD	7.99	2.090.384
ZINC	38.42	5.860.466
MISCELLANEOUS PARAMETERS (%)		
TOTAL SOLIDS	NC	NA
MISCELLANEOUS PARAMETERS (MG/KG)		
TOTAL ORGANIC CARBON	NC	NA
MISCELLANEOUS PARAMETERS (S.U.)		
pH	NC	NA

mg/kg = Milligrams per kilogram.
S.U. = Standard units.
NA = Not applicable.
NC = No criterion.
J = Value is estimated.
U = Analyte not detected at the reported detection limit.
MDL = Method detection limit.

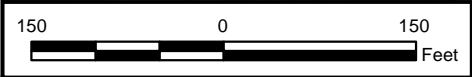
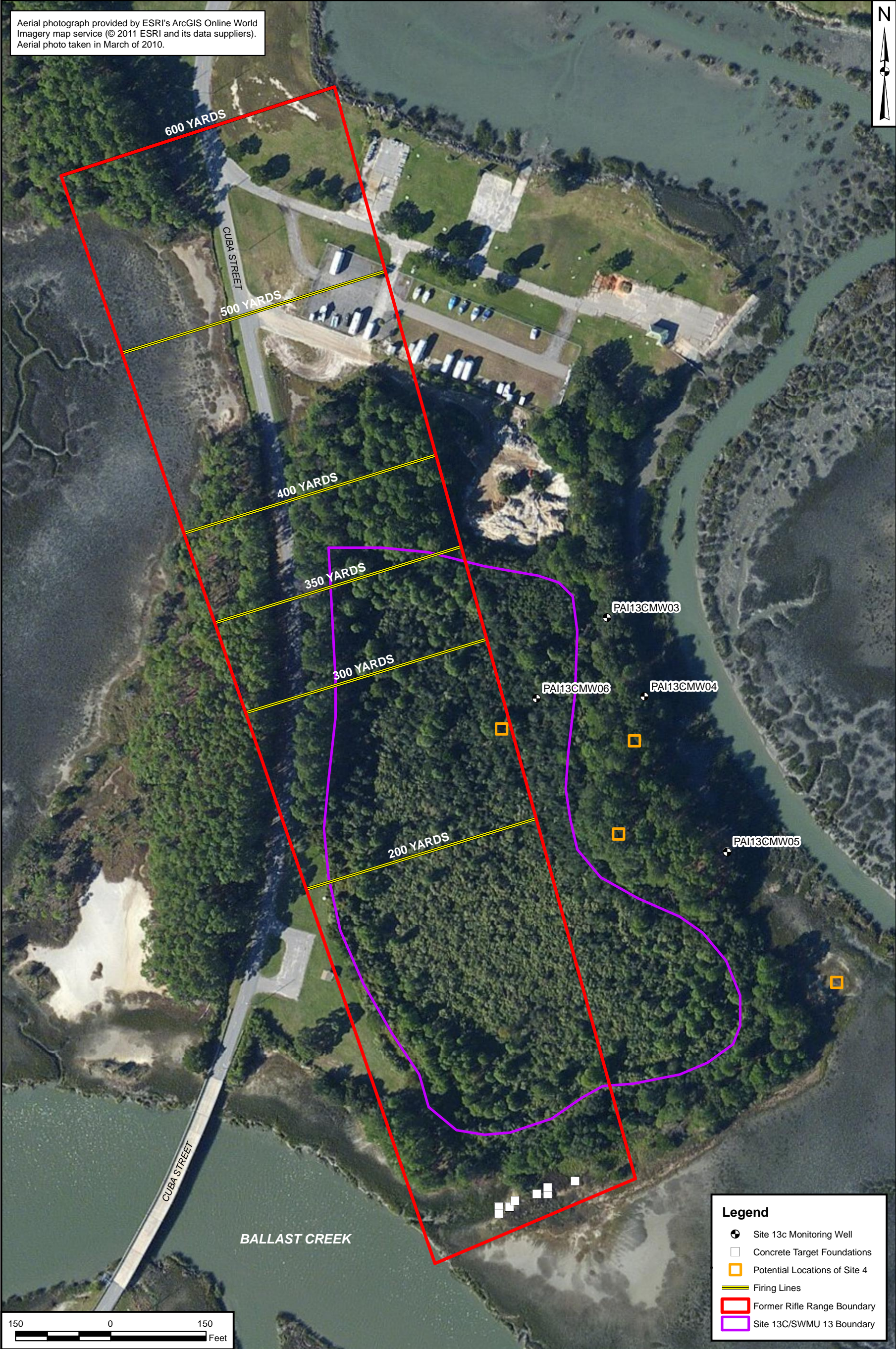
Shaded concentrations exceed background.

Sediment samples collected during SI were analyzed for lead only.
Select SI sediment samples were also analyzed for TOC.

Sediment samples collected during ESI were analyzed for select (antimony, arsenic, copper, lead, and zinc).
Select ESI sediment samples were also analyzed for TOC and pH.

(1) MCAS Beaufort background representative concentration (Tetra Tec

Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2011 ESRI and its data suppliers).
Aerial photo taken in March of 2010.



Legend

Site 13c Monitoring Well

Concrete Target Foundations

Potential Locations of Site 4

Firing Lines

Former Rifle Range Boundary

Site 13C/SWMU 13 Boundary

DRAWN BY	DATE
J. ENGLISH	02/07/13
CHECKED BY	DATE
M. COFFMAN	02/07/13
REVISED BY	DATE
SCALE AS NOTED	



SITE LOCATION
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	110
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE X2-1	0

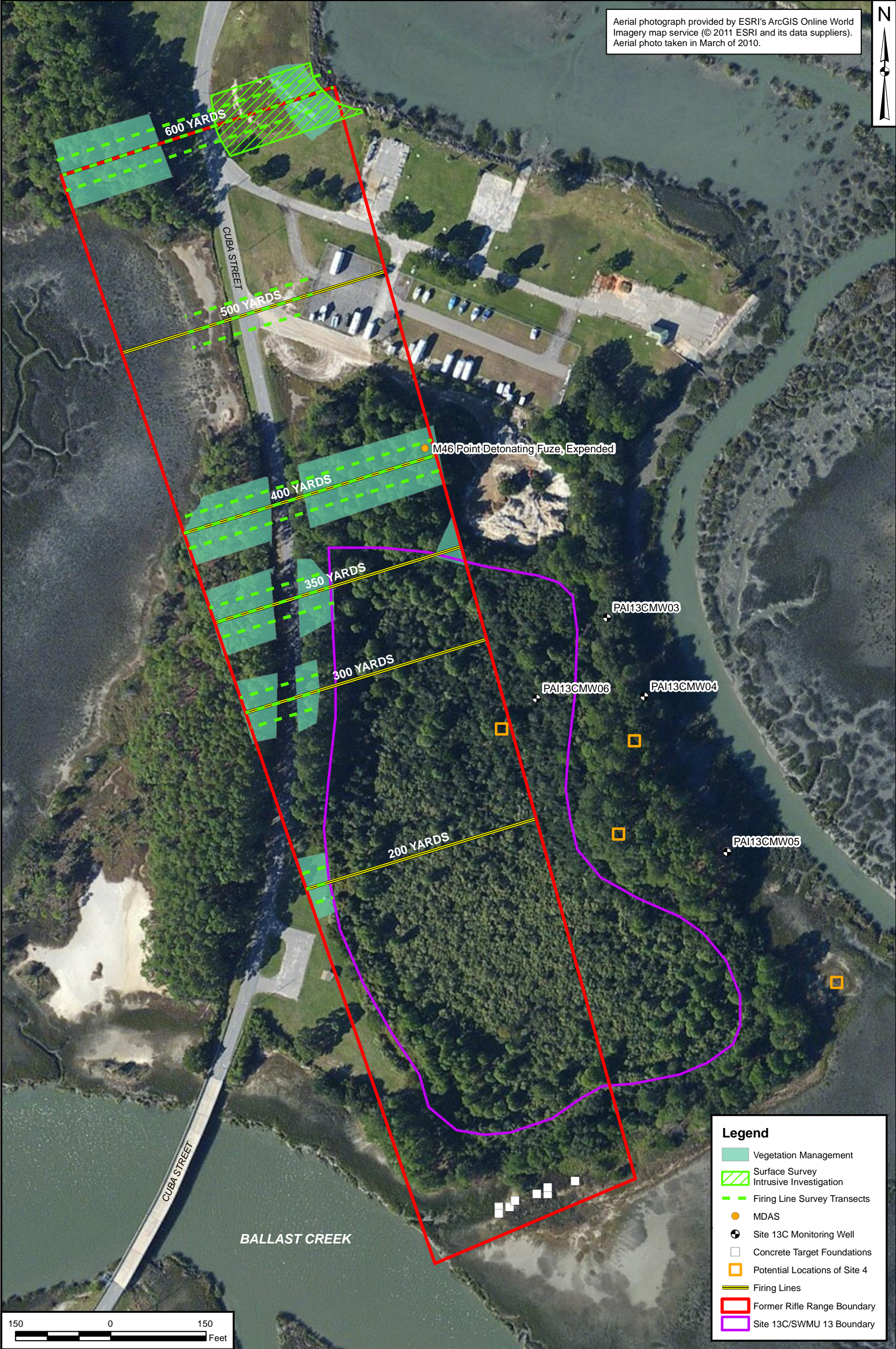


DRAWN BY	DATE
J. ENGLISH	08/16/11
CHECKED BY	DATE
M. COFFMAN	02/08/13
REVISED BY	DATE
J. ENGLISH	02/08/13
SCALE	
AS NOTED	



MAXIMUM RANGE OF SHOT
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	110
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE X2-2	0

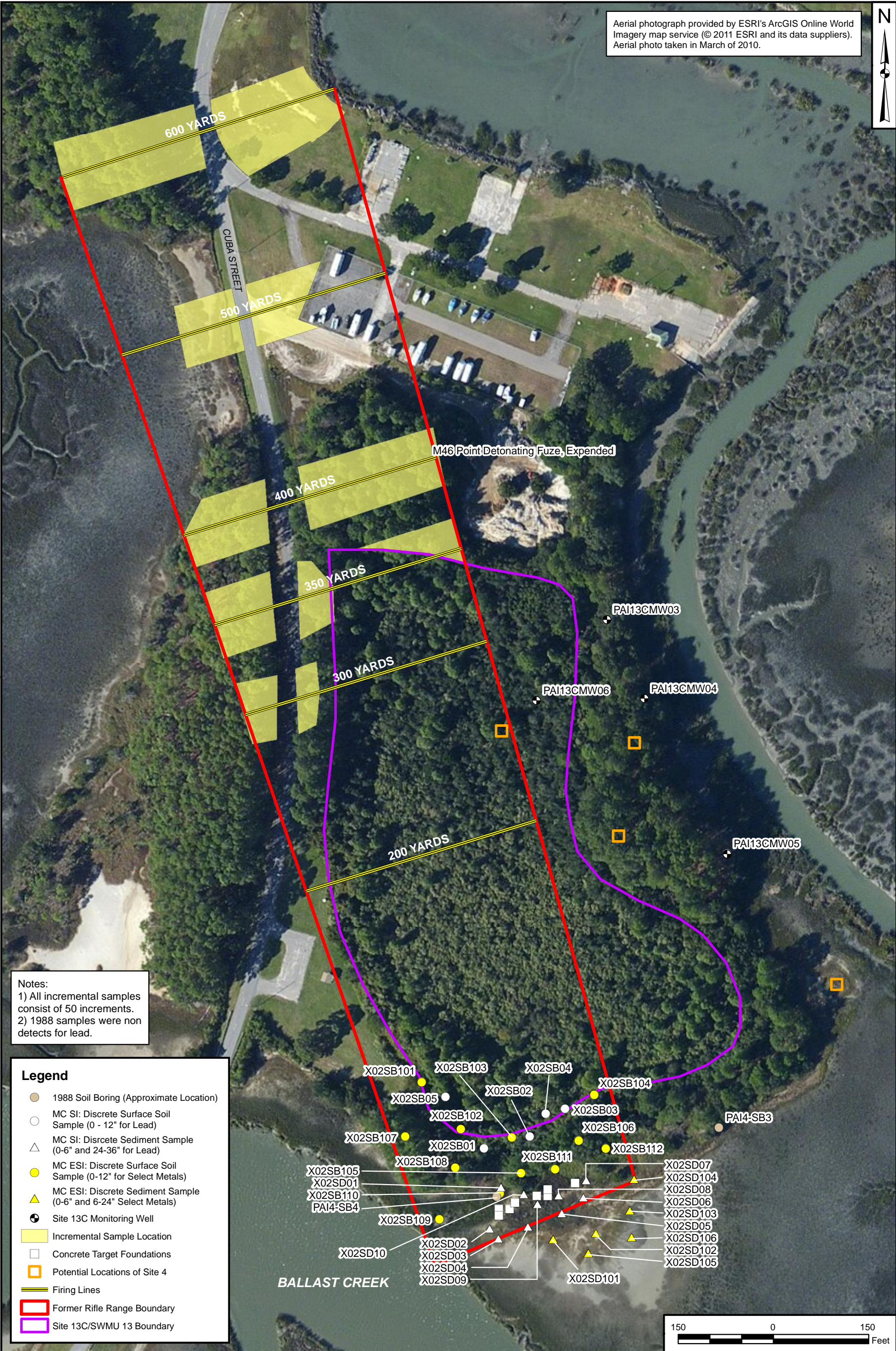


DRAWN BY	DATE
J. ENGLISH	02/08/13
CHECKED BY	DATE
M. COFFMAN	02/11/13
REVISED BY	DATE
SCALE AS NOTED	



MC SI / ESI VEGETATION MANAGEMENT AND
SITE SURVEY / INTRUSIVE INVESTIGATION AND FINDINGS
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	110
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE X2-3	0



DRAWN BY	DATE
J. ENGLISH	02/08/13
CHECKED BY	DATE
M. COFFMAN	02/08/13
REVISED BY	DATE
SCALE	
AS NOTED	



MC SI / ESI SAMPLE LOCATIONS
UXO 2 - RIFLE RANGE AT BALLAST CREEK
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	110
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
FIGURE X2-4	0

